NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

Conservation Cover

(Acre)

Code 327

DEFINITION

Establishing and maintaining permanent vegetative cover to protect soil and water resources.

PURPOSES

- Reduce soil erosion and sedimentation
- Improve water quality
- Enhance wildlife habitat.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on land to be retired from agricultural production requiring permanent protective cover, and on other lands needing permanent protective cover. This practice does not apply to plantings for forage production or to critical area plantings.

Use Field Office Technical Guide (FOTG) Standard 612 - Tree/Shrub Establishment when the landuser desires a predominantly tree or shrub planting.

When enhancement of wildlife habitat is the primary purpose, FOTG Standard 645 Upland Wildlife Habitat Management shall be used.

CRITERIA

General Criteria Applicable to All Purposes

Species shall be adapted to soil and climate conditions.

Species planted shall be suitable for the planned purpose and site conditions. Use of known invasive species shall be avoided.

Seeding rates and methods shall be adequate to accomplish the planned purpose.

Planting dates, planting methods and care in handling and planting of the seed or planting stock shall ensure that planted materials have an acceptable rate of survival.

Only viable, high quality and adapted seed or planting stock shall be used.

Legume seed shall be inoculated with the proper Rhizobia bacteria before planting.

Site preparation shall be sufficient for establishment and growth of selected species.

Timing and use of equipment shall be appropriate for the site and soil conditions.

Vegetative manipulation will be accomplished by mechanical, biological or chemical methods, by prescribed burning, or a combination of the four. All nutrients shall be applied following the nutrient management requirements in the Field Office Technical Guide (FOTG).

Temporary Cover.

1. Temporary cover will be established for erosion control and weed suppression when:

   (a) suitable seed or tree seedlings are not available;

   (b) the normal planting period for the species has passed;

   (c) chemical residues will not allow establishment of cover; and/or other limiting situations are present.

2. On fields without injurious herbicide carryover, seed with one of the cover crops listed below that are compatible with the herbicide previously used.

Oats	*1 bu/acre*
Barley	*1 bu/acre*
Winter Wheat	*1 bu/acre*
Rye	*1 bu/acre*
Annual Rye Grass	*10 lbs/acre*
*Sudan Grass**	*15 lbs/acre*

* Use on fields with potential herbicide carryover

3. Temporary cover crops shall be clipped prior to seed maturity unless otherwise directed in the plan.

Establishment of Introduced or Native Grasses and Legumes.

1. Lime and fertilizer.

A soil test from the year of seeding or during the two proceeding calendar years is required to determine the needed nutrients and liming materials for the establishment of cool season grasses and legumes.

(a) The rate of application for nutrients shall be from 75 to 100 percent of the recommended rate per acre, for each nutrient, for a 4-ton hay yield goal. Do not apply nitrogen to warm season grass seedings during the establishment period.. Phosphorous and Potassium should only be applied to warm season grass seedings if the soil test shows P and K levels in the deficient range.

(b) The recommended rate per acre of liming materials, as recommended in the soil test for the crop seeded, shall be used

2. **Seeding.**

Use information on attached Tables 1 - 6 to select the appropriate species, mixture and timing of establishment to meet practice criteria.. All seeding rates are given in pounds of Pure Live Seed (PLS) per acre.

To calculate percent PLS rates, multiply the percent purity by the percent germination. Divide the seeding rate by the %PLS to find the bulk seed needed per acre. Example: 98% Purity X 60% Germination = .588 PLS, 10 pounds seed per acre/.588 PLS = 17 pounds of bulk seed per acre.

(a) Cool Season Grasses and Legumes - Refer to Tables 1, 4 and 5. Use Table 1 to determine seeding rates of grasses and legume mixtures. Pure grass or legume seeding should only be used for specially approved situations. (Contact the NRCS State Agronomist for assistance with unusual situations) In those cases, Table 4 or 5 will be used.

(b) Warm Season Grasses - Use Table 6.

3. **Seedbed Preparation**.

(a) Weed control shall be accomplished by using mechanical and/or chemical control methods. Severe infestations of noxious or other competing weeds may require an application of an appropriate herbicide Follow label instructions for all herbicide applications.

(b) Conventional and mulch tillage - Prepare a fine firm seedbed to a depth of 3 to 4 inches. Incorporate lime and fertilizer during seedbed preparation. The seedbed shall contain enough fine soil particles for uniform shallow coverage and good seed to soil contact. Proper seeding depth is $1/8^{th}$ to $1/4^{th}$ inch.

(c) No-till - Apply herbicides according to label directions to kill or suppress existing vegetation and to control weeds. Apply fertilizer prior to seeding. Use a no-till drill adjusted to provide good seed to soil contact and a planting depth not to exceed 1/2 inch.

(d) Inoculate legume seed before seeding with the appropriate inoculant for the species being seeded. Pre-inoculated seed may be used but shall be re-inoculated if used beyond dates specified on the seed / inoculant tag.

4. Companion Crop.

1. A companion crop shall be used with spring seeded cool season grasses and legumes when erosion control and weed suppression are serious concerns. No companion crop is required for late summer seedings unless it is necessary for erosion control and to protect developing seedlings. Companion crop seeding rates shall be:

Oats	3/4 to 1 bu/acre
Barley	1/2 to 1 bu/acre
Winter Wheat	1/2 to 1 bu/acre
Rye	1/2 bu/acre
Annual Rye Grass	8 to 10 lbs/acre

2. A companion crop shall be used on highly erodible sites unless no tilling into 70% residue cover or standing small grain stubble.

On fields where atrazine was used in the preceding year use a seeding of sudangrass at 5 to 7 lbs/acre.

On fields without atrazine carryover use a seeding of oats at 1 bushel per acre.

Companion crops shall be clipped after jointing but before heading unless otherwise directed. A second and subsequent clipping is necessary when re-growth provides competition. Clipping height should be above developing seedlings. Where excessive growth has accumulated, the vegetation shall be chopped rather than swathed.

Additional Criteria for Enhancing Wildlife Habitat

Management practices and activities will not disturb cover during the primary nesting period of March 1 through July 15 for grassland species. Exceptions will be allowed for periodic burning or mowing when necessary to maintain the health of the plant community. Mowing may be needed during the plant establishment period to control weeds.

Maintenance measures shall be adequate to control noxious weeds and other invasive species.

When enhancement of wildlife habitat is one of the intended purposes, Tall Fescue shall not be used.

See Table 6 for species with high value for wildlife.

To benefit insect food sources for grassland nesting birds, spraying or other control of noxious weeds shall be done on a “spot” basis to protect forbs and legumes that benefit native pollinators and other wildlife.

If a native cover (other than what was planted) establishes, and the cover meets the intended purpose, protects the resources and meets the landowner's objectives, the cover shall be considered adequate.

CONSIDERATIONS

This practice may be used to promote the conservation of wildlife species in general, including threatened and endangered species.

Where applicable this practice may be used to conserve and stabilize archeological and historic sites.

Consider rotating management and maintenance activities (e.g. mow only one-fourth or one-third of the area each year) throughout the managed area to maximize spatial and temporal diversity.

Where wildlife management is an objective, the food and cover value of the planting can be enhanced by using a habitat evaluation procedure to aid in selecting plant species and providing or managing for other habitat requirements necessary to achieve the objective.

Consider contacting a forester or biologist for assistance in developing a plan to enhance the acreage for wildlife habitat. Review FOTG Standard 645 Upland Wildlife Habitat Management for further information.

Use native species when available. Consider trying to re-establish the native plant community for the site

Liming materials should be applied and incorporated prior to seeding for best results

PLANS AND SPECIFICATIONS

Specifications for this practice shall be prepared for each site. They shall include, but are not limited to, recommended species, seeding rates and dates, establishment procedures, and other management actions needed to insure an adequate stand. Specifications shall be recorded using approved specifications sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

Where use of grazing livestock is permissible, a prescribed grazing plan will be written.

Where use of harvested forage is permissible, a forage harvest management plan will be written.

OPERATION AND MAINTENANCE

Maintenance practices and activities shall not disturb cover during the primary nesting period for grassland species (March 1 - July 15). Exceptions should be considered for periodic burning or mowing when necessary to maintain the health of the plant community. Mowing may be needed during the establishment period to reduce competition from annual weeds. Noxious weeds will be controlled to prevent proliferation and spreading to adjacent fields.

Annual mowing of the conservation cover stand for general weed control is not recommended.

Any use of fertilizers, pesticides and other chemicals shall not compromise the intended purpose.

Where use of grazing livestock is permissible, a prescribed grazing plan will be followed.

Where use of harvested forage is permissible, a forage harvest management plan will be followed.

Table 1. Seeding Rates for Grass - Legume Mixes

Select One or Two Legumes **Pounds of Pure Live Seed per Acre**				***Select One Grass*** ***Pounds of Pure Live Seed per Acre***				
Primary Legume		**Secondary Legume**		***Orchard-grass***	***Tall Fescue***	***Smooth Brome-grass***	***Timothy***	***Kentucky Blue-grass***
Alfalfa	8 -10			*4 - 6*		*5 - 7*	*2 - 4*	
Alfalfa	4 - 6	Red Clover	4 - 6	*4 - 6*		*5 - 7*	*2 - 4*	
Alfalfa	6 - 8	Red Clover	2 - 4	*4 - 6*		*5 - 7*	*2 - 4*	
Alfalfa	6 - 8	Ladino Clover	1/4	*4 - 6*		*5 - 7*	*2 - 4*	
Red Clover	6 - 8			*4 - 6*	*8 - 10*	*5 - 7*	*2 - 4*	
Red Clover	4 - 6	Ladino Clover	1/4	*4 - 6*	*8 - 10*	*5 - 7*	*2 - 4*	
Red Clover	6 - 8	Common, Kobe, or Marion Lespedeza *(Kummerowia striata*	8	*4 - 6*	*8 - 10*		*2 - 4*	
Alsike Clover	3 - 4			*4 - 6*	*8 - 10*	*5 - 7*	*2 - 4*	
Alsike Clover	2	Ladino Clover	1/4	*4 - 6*	*8 - 10*	*5 - 7*	*2 - 4*	
Birdsfoot Trefoil	5			*4 - 6*			*2 - 4*	*2 - 4*
Common, Kobe, or Marion Lespedeza *(Kummerowia striata*	15			*4 - 6*	*8 - 10*		*2 - 4*	
Ladino Clover	1			*4 - 6*	*8 - 10*	*5 - 7*	*2 - 4*	

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Table 2

Seeding Dates and Rates for Single Species of Legumes for Special Situations

Legumes	Seeding Dates	Seeding Rate (lbs./acre pure live seed)
Alfalfa 2/	March 1 - May 1 or August 1 - September 1	10 - 12
Alsike Clover 2/	January 1 - May 1 or August 1 - September 1	6 - 10
Birdsfoot Trefoil 2/	March 1 - May 1 or August 1 - September 1	4 - 6
Hairy Vetch 2/	August 1 - October 1	20 - 30
Common, Kobe, or Marion Lespedeza *(Kummerowia striata* 2/	February 1 - May 1	25 - 30
Ladino Clover 2/	January 1 - May 1	2 - 4
Red Clover 2/	January 1 - May 1 August 1 - September 1	8 - 10
Sweetclover 1/	February 1 - May 1	10 - 12
White Dutch Clover	January 1 - May 1 or August 1 - September 1	2 - 4

1 Temporary Cover Crop. Mow, plow or burn down before seed head develops to reduce risk of spreading if the site is near natural areas.

2 Use rates in Table 1 if used as component in a grass-legume mix

Table 3

Seeding Dates and Rates for Single Species of Pure Stands of Grasses for Special Situations

Grass Species	Seeding Dates	Seeding Rate (lbs./acre pure live seed)
Barley 1/ 4/	September 15 - October 15	96
Big Bluestem 3/	April 15 - May 30	8
Indiangrass 3/	April 15 - May 30	8
Kentucky Bluegrass 2/ 4/	February 1 - May 1 or August 1 - September 1	5 - 10
Orchardgrass 2/	March 1 - May 1 or August 1 - September 1	10
Pearl Millet 1/	May 1 - June 1	15 - 20
Red Top 2/ 4/	February 1 - May 1	3 - 6
Rye	September 15 - October 30	112
Rye Grass	March 1 - May 1 or August 1 - September 1	15 - 20
Smooth Bromegrass 2/	February 1 - May 1 or August 1 - September 1	8
Sorghum X Sudangrass 1/	May 1 - July 15	20
Spring Oats 1/ 4/	March 1 - April 15 or August 1 - September 1	96
Sudangrass 1/	May 1 - July 15	25
Switchgrass 1/	April 15 - May 30	4

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Table 3 Cont.

Grass Species	Seeding Dates	Seeding Rate (lbs./acre pure live seed)
Tall Fescue 2/	March 1 - May 1 or August 1 - September 1	15
Timothy 2/ 4/	February 1 - May 1 or August 1 - November 1	3 - 6 Heavier rate in the spring
Wheat 1/ 4/	September 15 - October 30	120

1 Temporary cover crop

2 Use rates in Table 1 if used as component in a grass-legume mix

3 Warm season grass

4 Companion crop

Table 4

Grass Species Characteristics

Soil Characteristics (Minimum Adequate Level)			*Plant Characteristics*						**Seed Characteristics**		
Drainage	**Soil Fertility**	**Soil pH**	Species	*Longevity*	*Winter Hardiness*	*Growth Habit*	*Drought Tolerance*	*Cool or Warm Season*	**Seed per Pound**	**Emergence Time (Days)**	**Opti-mum Germ. Temp (F)**
PD	Low	5.4-6.2	Redtop	Perennial	Good	Bunch	Fair	Cool	4,990,000	10	70-85
SPD	Low Medium	5.4-6.2	Switchgrass	Perennial	Good	Sod	Good	Warm	389,000	21	60-85
SPD	Low Medium	5.8-6.2	Rye	Annual	Very Good	Bunch	Good	Cool	18,000	7	60-70
SPD	Medium	5.4-6.2	Tall Fescue	Perennial	Fair	Sod	Fair	Cool	227,000	14	60-85
SPD	Medium	5.5-6.2	Orchardgrass	Perennial	Fair	Bunch	Fair	Cool	654,000	18	60-75
SPD	Medium	5.4-6.2	Timothy	Perennial	Good	Bunch	Poor	Cool	1,230,000	10	60-85
SPD	Medium	5.8-6.5	Kentucky Bluegrass	Perennial	Good	Sod	Poor	Cool	2,177,000	28	60-75
SPD	Medium	6.0-6.5	Wheat	Annual	Good	Bunch	Good	Cool	15,000	7	60-70
SPD	Medium	6.2-6.8	Barley	Annual	Fair-Good	Bunch	Good	Cool	14,000	7	60-75
SPD	Medium High	5.6-6.2	Ryegrass	Annual or Perennial	Fair	Bunch	Poor	Cool	227,000	14	60-75

Table 4 Cont.

Grass Species Characteristics

Soil Characteristics (Minimum Adequate Level)			*Plant Characteristics*						**Seed Characteristics**		
Drainage	**Soil Fertility**	**Soil pH**	Species	*Longevity*	*Winter Hardiness*	*Growth Habit*	*Drought Tolerance*	*Cool or Warm Season*	**Seed per Pound**	**Emergence Time (Days)**	**Opti-mum Germ. Temp (F)**
SPD	High	5.8-6.5	Smooth Bromegrass	Perennial	Good	Sod	Good	Cool	136,000	14	70-85
MWD	Low Medium	5.4-6.2	Big Bluestem	Perennial	Good	Sod	Good	Warm	165,000	28	60-85
MWD	Low Medium	5.4-6.2	Indianagrass	Perennial	Good	Sod	Good	Warm	175,000	28	60-85
MWD	Medium	6.2-6.8	Pearl Millet	Annual	-	Bunch	Good	Warm	88,000	7	70-85
MWD	Medium	6.0-6.5	Spring Oats	Annual	-	Bunch	Poor	Cool	13,000	10	60-70
MWD	Medium High	6.0-6.5	Sudangrass	Annual	-	Bunch	Good	Warm	55,000	10	60-85
MWD	Medium High	6.0-6.5	Sorghum X Sudan	Annual	-	Bunch	Good	Warm	28,000	10	60-85

VPD - Very Poorly Drained PD - Poorly Drained SDP - Somewhat Poorly Drained MWD - Moderately Well Drained

Table 5

Legume Species Characteristics

Soil Characteristics (Minimum Adequate Level)			*Plant Characteristics*					**Seed Characteristics**		
Drainage	**Soil Fertility**	**Soil pH**	Species	*Longevity*	*Winter Hardiness*	*Drought Tolerance*	*Cool or Warm Season*	**Seed per Pound**	**Emergence Time (Days)**	**Optimum Germ. Temp (F)**
PD 1/	Medium	6.0-6.5	Alsike Clover	Perennial (acts as biennial)	Good	Fair	Cool	700,000	7	70
SPD	Low	5.5-6.2	Common, Kobe, or Marion Lespedeza *(Kummerowia striata*	Annual	--------	Fair	Warm	225,000	14	70
PD	Medium	6.0-6.5	White Dutch Clover	Perennial	Good	Poor	Cool	800,000	10	70
PD	High	6.0-6.5	Ladino Clover	Perennial	Fair	Poor	Cool	860,000	10	70
SPD	Medium	5.8-6.5	Hairy Vetch	Winter Annual	Fair Poor	Fair	Cool	20,000	14	70
SPD	Medium	6.0-6.5	Birdsfoot Trefoil	Perennial	Good	Fair	--	375,000	7	70
SPD	Medium	6.2-6.8	Red Clover	Perennial (acts as biennial)	Good	Fair	Cool	275,000	7	70
WD	Medium High	6.8-7.2	Sweetclover	Annual or Biennial	Good	Good	Cool	260,000	7	70
WD	High	6.6-7.2	Alfalfa	Perennial	Good	Good	Cool	200,000	7	70

VPD - Very Poorly Drained PD - Poorly Drained SDP - Somewhat Poorly Drained MWD - Moderately Well Drained

Table 6. Seeding Mixtures for Warm Season Grasses.[1]

Seeding Mixtures	Application Rate (lbs./ac of PLS)		Soil Drainage Class Suitability
	Wildlife	Erosive Areas	
Big Bluestem	0.75	1	PD - ED
Indiangrass	0.75	1	SPD - ED
Little Bluestem	1.75	2.5	MWD - ED
Sideoats Grama	1	1.5	MWD - ED
or Canada wildrye	1	2	MWD - ED
Common, Kobe, or Marion Lespedeza[2] *(Kummerowia striata)* **or** a forb mix[4]	2	2	MWD - ED
Little Bluestem	2.5	4	MWD - ED
Indiangrass	0.75	1	SPD - ED
Sideoats Grama	0.75	1	MWD - ED
or Canada wildrye	1	2	MWD - ED
Common, Kobe, or Marion Lespedeza[2] *(Kummerowia striata)* **or** a forb mix[4]	2	2	MWD - ED
[3]Switchgrass	1.75	2	PD - ED
or Switchgrass **and**	0.5	1	PD - ED
Virginia wildrye	1	2	PD - WD
Big Bluestem	1	2	PD - ED
Indiangrass	0.5	1	SPD - ED
Common, Kobe, or Marion Lespedeza[2] *(Kummerowia striata)* **or** a forb mix[4]	2	2	MWD - ED

Seeding Mix	Application Rate Lbs./ac. PLS		Soil Drainage Class
	Wildlife	Erosive Areas	
Big Bluestem	1	1.5	PD - ED
Indiangrass	1.5	2	SPD - ED
Little Bluestem	1	1.0	MWD - ED
Sideoats Grama	0.5	1.0	MWD - ED
or Canada wildrye	1	1	MWD - ED
Common, Kobe, or Marion Lespedeza[2] *(Kummerowia striata)* **or** a forb mix[4]	2	2	MWD - ED

[1] If using prepackaged mixes, application rates shall be equal to those listed in Table 6 for designated uses.

[2] Substitutes for *Lespedezas* must be used on sites north of Interstate 70.

[3] This seeding mixture can be used on wet sites.

[4] Use ½ to 1 lb. of a perennial forb mix, with a minimum of 5 species (see Forb List below) in approximately equal proportions.

The following key for Soil Drainage Class Suitability applies to the tables listed above and below.
ED = Excessively Drained
WD = Well Drained
MWD = Moderately Well Drained
SPD = Somewhat Poorly Drained
PD = Poorly Drained
VPD = Very Poorly Drained

Note: Add any of the forb species, at the rates listed below, to the mixes in Tables 6 for added wildlife and aesthetic benefits.

Forb List

Species	oz./ acre	Soil Drainage Class Suitability
Blackeyed Susan *Rudbeckia hirta*	1	MWD-ED
Butterfly Weed *Asclepias tuberosa*	3	MWD – ED
Button Blazing Star *Liatris aspera*	2	MWD – ED
Cardinal Flower *Lobelia cardinalis*	0.5	PD - SPD
Dense Blazing Star *Liatris spicata*	2	PD – WD
Entire-Leaf Rosinweed *Silphium integrifolium*	4	MWD – ED
False Sunflower *Heliopsis helianthoides*	1	MWD – ED
Flat Topped Aster *Aster umbellatus*	2	PD – SPD
Gray-Headed Coneflower *Ratibida pinnata*	2	MWD – ED
Hoary Tick Trefoil (L) *Desmodium canescens*	3	MWD – ED
Lead Plant *Amorpha canescens* (L - small shrub)	1	WD – ED
Lespedeza, Roundheaded *Lespedeza capitata* (L)	2	MWD – ED
Lespedeza, Slender *Lespedeza virginica* (L)	2	MWD – ED
New England Aster *Aster novae-angliae*	1	PD – WD
New Jersey Tea *Ceanothus americanus* (small shrub)	2	MWD - ED
Nodding Bur Marigold *Bidens cernua*	2	PD - SPD
Obedient Plant *Physostegia virginiana*	2	PD - SPD
Ohio Spiderwort *Tradescantia ohiensis*	2	SPD – WD
Partridge Pea *Cassia fasciculata* (L)	4	MWD – ED
Prairie Dock *Silphium terebinthinaceum*	4	SPD – ED
Riddell's Goldenrod *Solidago riddelli*	1	SPD – ED
Sawtooth Sunflower *Helianthus grosseserratus*	1	PD – WD
Sneezeweed *Helenium autumnale*	1	PD - SPD
Spotted Joe Pye Weed *Eupatorium maculatum*	1	PD - SPD
Swamp Aster *Aster puniceus*	1	PD - SPD
Swamp Milkweed *Asclepias incarnata*	3	PD - SPD
Tall Coreopsis *Coreopsis tripteris*	3	SPD – ED
Virginia Blue Flag *Iris virginica var. shrevei*	4	PD - SPD
Virginia Mountain Mint *Pycnanthemum vir.*	1	SPD – WD
White Wild Indigo *Baptisa leucantha* (L)	4	MWD – ED
Wild Bergamot *Monarda fistulosa*	2	SPD – WD
Wild Quinine *Parthenium integrifolium*	2	MWD – ED
Wild Senna *Cassia hebecarpa* (L)	4	PD – WD

(L) = Legume

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